PECO

Smart Future Greater Philadelphia

Abstract

PECO's Smart Future Greater Philadelphia project includes deployment of advanced metering infrastructure (AMI) and distribution automation assets. AMI supports new electricity pricing programs for customers and pilot programs, such as in-home devices that provide energy information and energy usage control. Distribution automation helps PECO improve service to customers and reduce energy loss by managing circuit voltages. These systems help PECO improve operational efficiency and service quality for customers.

Smart Grid Features

Communications infrastructure is multi-tiered and includes a high-bandwidth fiber optics and microwave "core" network for Tier 1; a medium-bandwidth radio frequency "backhaul" for Tier 2; a low-bandwidth radio frequency "field area network" for Tier 3; and supports home area networks for Tier 4. The project includes installing 340 miles of fiber optic cable connecting 61 substations for the Tier 1 core network and providing new digital communications for existing system telemetry, voice, and protection applications ; the Tier 2 wireless backhaul network connecting Tier 3 to Tier 1; and a Tier 3 network providing system-wide communications for AMI and distribution automation. The new communications infrastructure supports more flexible and reliable operation of the distribution system while providing PECO the ability to add future programs and functionality for its customers.

Advanced metering infrastructure includes an accelerated deployment of 600,000 smart meters, a meter data management system, and the integration of AMI with existing back-office systems. PECO's AMI supports outage and restoration notifications and a remote service switch that enables PECO to respond to outages and customer requests more efficiently.

Advanced electricity service options include the deployment of in-home displays and programmable communicating thermostats. These devices, in conjunction with customer Web portal access, facilitate two-way information exchange and enable customers to better manage their electricity bills through improved understanding of electricity consumption patterns of appliances and equipment. In

At-A-Glance

Recipient: PECO

State: Pennsylvania

NERC Region: ReliabilityFirst Corporation

Total Budget: $415,118,677

Federal Share: $200,000,000

Project Type: AMI, Customer Systems AMI, and Customer Systems

Equipment

- **600,000 Smart Meters**
- **AMI Communication Systems**
  - **Meter Communications Network**
  - **Backhaul Communications**
- **Meter Data Management System**
- **Customer Web Portal**
- **In-Home Displays**
- **Programmable Communicating Thermostats**
- **Distribution Automation Equipment for 75 out of 2,278 Circuits**
  - **Distribution Management System**
  - **Distribution Automation Communications Network**
  - **Automated Distribution Circuit Switches**
  - **Automated Capacitors**
  - **Smart Relays***
  - **Equipment Condition Monitors**

**Smart Relays are installed at select substations.*

Time-Based Rate Programs

- **Time of Use**
- **Critical Peak Pricing**

Key Targeted Benefits

- **Reduced Electricity Costs for Customers**
- **Improved Electric Service Reliability and Power Quality**
- **Reduced Costs from Equipment Failures, Distribution Line Losses, and Theft**
- **Deferred Investment in Distribution Capacity Expansion**
- **Reduced Truck Fleet Fuel Usage**
- **Reduced Greenhouse Gas and Criteria Pollutant Emissions**

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addition, PECO will engage in customer education and outreach to the public on availability and benefits of these in-home technologies, as well as other components of the project, including the basics on smart meters and time-based rate program options.

Time-based rate programs educate customers about time-based pricing options and encourage them to take action during times of high electricity prices. Rate options, including critical peak pricing and time-of-use rates, are designed to work with enabling technologies such as programmable communicating thermostats and in-home displays. PECO's plan has been developed involving input from stakeholders and the Pennsylvania Public Utility Commission (PAPUC). PECO also plans to conduct pilot demonstrations with a limited number of low-income (customer assistance programs, or CAP) customers provided with smart meters and in-home displays. The pilot is designed to help CAP customers understand how much energy they use and how their usage compares to their CAP rate monthly allowance. This information and the accompanying educational materials are designed to help these customers more effectively manage their energy consumption. PECO has already filed its time-based rate program plan with the PAPUC and an order is expected no later than April 28, 2011. Details of the time-based rate program options may change as a result of the Commission order.

Distribution automation systems include more than 100 new reclosers and communications upgrades for 300 existing reclosers. These devices will help reduce sustained outages and restoration times and improve operational efficiency. Systems also include intelligent substation upgrades with disturbance monitoring capabilities.

Distribution system energy efficiency improvements involve the integration of automated capacitor banks installed at two substations and a power quality monitoring system. The capacitors improve voltage and VAR control, power quality, and increase distribution capacity by reducing energy losses on the distribution system. Furthermore, the integration of distribution management system involves integration with the other distribution automation assets to enable PECO to manage power distribution to better match customer demand.

Timeline

Key Milestones	Target Dates
Distribution asset deployment begins	Q3 2011
AMI asset deployment begins	Q2 2012
AMI and distribution asset deployment ends	Q2 2013

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